

Remarks

Claims 1-7 are pending herein. By this Amendment, claims 1, 5 and 6 have been amended.

Claims 1, 5 and 6 have each been amended to recite that the heat treatment apparatus is cleaned by supplying a mixed gas of an HF gas and an NH₃ gas into the treatment vessel for a period of 0.6 minute or less. Support for this recitation can be found in the specification at, e.g., page 12, lines 18-26.

In the Final Office Action, claims 1, 2, 5 and 6 are rejected under 35 U.S.C. §103(a) as being unpatentable over JP1-286424 ("JP '424"); and claims 3, 4 and 7 are rejected under §103(a) as being unpatentable over JP '424 in view of JP08-195381 ("JP '381") and U.S. Patent No. 6,880,561 to Goto et al. ("Goto").

In view of the amendments and remarks herein, Applicants respectfully request reconsideration and withdrawal of the rejections set forth in the Office Action.

I. Rejection of Claims 1, 2, 5 and 6

As noted above, claims 1, 2, 5 and 6 are rejected under §103(a) as being unpatentable over JP '424.

Claims 1, 5 and 6 are independent claims. Claim 2 depends upon claim 1.

Claims 1, 5 and 6 have been amended to recite that the heat treatment apparatus is cleaned by supplying a mixed gas of an HF gas and an NH₃ gas into the treatment vessel for a period of 0.6 minute or less.

According to the instant specification:

as explained above, since the total period required for the cleaning treatment can be remarkably reduced, even if an end point of the cleaning treatment is miscounted, an erroneous, excessive cleaning treatment is performed for only a short period of time.

Consequently, damage to the quartz material can be noticeably restrained. Herein, it is supposed that, for example, a 10% error may occur in calculating a period required for the cleaning treatment. In the conventional method, when a calculated cleaning period is 60 minutes, an excessive cleaning treatment may be carried out for six minutes. On the other hand, in the present invention, since a calculated cleaning period is 0.6 minutes (under the condition that the etching rate is 96.6 nm/min), an excessive cleaning treatment may be carried out only for 0.06 minutes (3.6 seconds). Accordingly, the method according to the

present invention can significantly restrain the quartz material from being damaged. [emphasis added] (page 12, lines 10-26).

As pointed out in the quoted passage above, because the mixed gas of HF gas and NH₃ gas is supplied into the treatment vessel for a period of 0.6 minute or less (even when a 10% error may occur in calculating a period required for the cleaning treatment), an excessive cleaning treatment may be carried out for 0.06 minutes or less, which can significantly restrain damage to the quartz material.

JP '424 does not teach or suggest supplying a mixed gas of an HF gas and an NH₃ gas into a treatment vessel for a period of 0.6 minute or less. The abstract of JP '424 teaches that:

[b]y this cleaning method, foreign odor is completely eliminated within about 5 min, and product left on the side wall and the floor of the reaction chamber 11 is easily exfoliated. [emphasis added]

Thus, for at least this reason, Applicants respectfully submit that claims 1, 2, 5 and 6 would not have been obvious over JP '424.

II. Rejection of Claims 3, 4 and 7

Claims 3, 4 and 7 are rejected under §103(a) as being unpatentable over JP '424 in view of JP '381 and Goto.

Claims 3 and 4 depend upon either claim 1 or claim 2, and claim 7 depends upon claim 3. Therefore, claims 3 and 4 are patentable over JP '424 for at least the same reason that claims 1 and 2 are patentable over this reference, i.e., JP '424 does not teach or suggest supplying a mixed gas of an HF gas and an NH₃ gas into a treatment vessel for a period of 0.6 minute or less.

JP '381 does not disclose a cleaning period. Goto does not teach or suggest the use of a mixed gas of HF gas and NH₃ gas and, therefore, does not teach or suggest a cleaning period for such a mixed gas. Thus, neither JP '381 nor Goto would have made it obvious to use a cleaning period of 0.6 minute or less in JP '424.


Therefore, for at least this reason, Applicants respectfully submit that claims 3, 4 and 7 would not have been obvious over JP '424 in view of JP '381 and Goto.

III. Conclusion

In view of the amendments and remarks herein, Applicants respectfully request that the rejections set forth in the Office Action be withdrawn and that claims 1-7 be allowed.

If any additional fees under 37 C. F. R. §§ 1.16 or 1.17 are due in connection with this filing, please charge the fees to Deposit Account No. 02-4300, Order No. 033082M286.

Respectfully submitted,
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Enclosures: (1) Request for Continued Examination
(2) Check for the Sum of \$790